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santa barbara county association of governments

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SBCAG

MODEL IMPROVEMENT PLAN

An Application

For

PROPOSITION 84 FUNDS

September 22, 2009

2009 MEMBERSHIP ROSTER
SANTA BARBARA COUNTY ASSOCIATION OF GOVERNMENTS

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I. Introduction

The Santa Barbara County Association of Governments (SBCAG), in its capacity as the designated Metropolitan Planning Organization (MPO) and Regional Transportation Planning Agency (RTPA) for Santa Barbara County, is responsible under federal and state law for developing transportation plans and programs for the region, and to do so through a "continuing cooperative, and comprehensive" planning process, carried out in cooperation with other state, regional and local agencies.

The Governing Board of SBCAG consists of the five members of the County Board of Supervisors plus one city council representative from each of the eight cities within the county. Principle responsibilities of SBCAG include all regional transportation planning and programming activities within Santa Barbara County including identifying and funding major infrastructure improvements, implementation of Measure "A," a local option sales tax for transportation improvements, managing a travel demand management program, and developing and implementing ongoing efforts to reduce traffic congestion throughout the region, among other tasks.

In response to the Strategic Growth Council (SGC) invitation to apply for Proposition 84 Funds, SBCAG is pleased to submit this application which seeks funding for improvements of the SBCAG travel model. This will enable SBCAG to comply with the Senate Bill (SB) 375 mandate to reduce greenhouse gas (GHG) emissions and improve the land use-transportation connection. These model improvements will also assist SBCAG in assessing Sustainable Communities Strategies (SCS) and, if needed, Alternative Planning Strategies (APS) so SBCAG can more accurately quantify and meet the established GHG reduction targets for Santa Barbara County.

In compliance with SB 375 and for consistency with the RTP Modeling Guidelines, SBCAG is responding to "*Objective 1 - Regional Model Development and Data Gathering for MPOs*" as identified in the "Funding Objectives and Eligibility" section of the *"Criteria for Awarding Proposition 84 Funds, Model Development and Data Gathering, September 9, 2009.*"

This application and attached Appendices outline the current status of the SBCAG Travel Demand Model and identifies data gaps and needs for the SBCAG model improvements to meet the requirements of SB 375. The application also provides specific details of the SBCAG Model Improvement Plan (MIP) and provides the timeline, costs, and deliverables of model improvements. SBCAG also states its commitments to achieving the objectives of this grant and other requirements in support of the application.

II. Current Status of the SBCAG Travel Demand Model

SBCAG currently maintains a countywide regional travel demand model (SBCAG Model). Staff applies and maintains the model in-house and works in close cooperation with state, regional and local agencies to forecast traffic growth, assess demand for transportation infrastructure improvements, evaluate corridor alignment alternatives, and in the recent past, when SBCAG was designated as a federal ozone non-attainment area, determine air quality conformity between the SBCAG Regional Transportation Plan (RTP) and Federal Transportation Improvement Program with our County SIP.

The SBCAG model is a traditional 4-step trip-based model. The four main models are trip generation, trip distribution, mode choice, and assignment. The model domain consists of Santa Barbara County plus the two neighboring counties of Ventura and San Luis Obispo.

A multi layer logit mode choice model is employed to analyze and predict choices of travel mode. The nested structure allows daily person trips to be modeled more precisely by various sub-modes. Mode choice outputs include bike and walk trips. Once transit trips are estimated, they are assigned to a transit route network. The network is a comprehensive route structure developed for eight types of transit services provided by five major transit operators who deliver transit services in the County. The Caltrans Household Travel Survey for Santa Barbara County provides crucial travel information on trip purpose, modes, trip lengths, frequency, and other travel characteristics including time-of-day (TOD) distributions for model calibration and validation.

The SBCAG Model employs a socioeconomic, distinct from land use, data-base. The model database consists of a variety of data including households, employment, household size, income, plus a number of special generators

Peak hour traffic is modeled under 3 time periods (AM, PM and Midday).

The SBCAG model runs on the TransCAD platform. "Traffix" software from Dowling Associates is used to supplement the analytical capability for intersection level of service analyses under the Congestion Management Program (CMP). The SBCAG Model is maintained in-house with continuing refinements. However, SBCAG relies on consulting assistance for major updates.

Additional information about the SBCAG Model structure, model calibration and validation procedures, and traffic forecasts are available in the appendix and additional technical documentation.

III. SBCAG Travel Model Data and Capability Improvements to Meet SB375 Requirements

During February this year, the Regional Targets Advisory Committee (RTAC) requested that the 18 MPOs around the state to provide information on existing modeling capabilities and data collection programs. This survey assisted RTAC in developing their methodology for GHG emission reduction target recommendations to the California Air Resources Board (ARB). Their assessment focused on two general concerns:

- *Are MPO models reasonably sensitive to key factors and policy variables which are potentially of great interest for target-setting or implementation of SB375?*

- *Are models comparable in their capabilities across the state, providing a "level playing field" for evaluation of land use or transportation policies or factors of interest for target setting or implementation of SB375?*

SBCAG and other MPOs participated in this exercise which identified current modeling capabilities, existing data and technical gaps in travel and land use modeling. Although SBCAG existing travel model protocols are consistent with the federal and state guidelines for travel models, SBCAG will need to significantly enhance our existing data and travel model methods to address the requirements of SB 375. The following is a self assessment which identifies data

gaps and technical improvements needed so the SBCAG travel model can effectively address the requirements of SB 375. Appendix II provides additional detail on the existing data gaps and needed capability improvements.

- Travel behavior. SBCAG uses data from the statewide household travel surveys in the mode choice model calibration and validation process. However this survey has not been updated for some time.

- Employment. Employment data requires updating and is important in establishing trip attractions.

- Land Use. Greater detail on parcel specific land uses are needed to assess the land use implications of alternative growth scenarios.

- Constraints. SBCAG has few digital GIS inventories of resource areas to enable use of GIS rule based applications to evaluate the resources areas identified in SB 375.

- Land Use Transportation Scenario Development. SBCAG's existing capability is relatively static and does not easily permit alternative land use scenario testing.

- Fuel pricing. SBCAG does not have a road or fuel pricing option to address recent interest in how fuel price fluctuations impact travel.

IV. SBCAG Model Improvement Plan (MIP)

Tables 1 and 2 summarizes the SBCAG Model Improvement Plan (MIP) by specific model improvement work tasks for the short-term (2010-11), medium term (2012-14), and long term (2015 and beyond) time frames.

Initially SBCAG is focused on improving the data base with the addition of household survey data obtained with household surveys and on board transit surveys. Land use data is improved with the acquisition and development of a parcel level data system. Model improvements occur with the addition and development of 4-D Post Processing capability, dynamic assignment, enhancement of bike and pedestrian outputs, and, better model evaluation and reporting.

In the mid-term the parcel data is integrated with the travel model and environmental constraints are digitized to permit rule based constraint analysis. Sketch planning capabilities are added to enhance the land use transportation connection. Development of a complete land use transportation modeling package is initiated using IPlaces3 or PECAS.

In the long term SBCAG transitions to an activity based model.

Table 1: SBCAG Model Improvement Plan ROADMAP (Page 1 of 2)

	Data Gathering, Management and Application	Land Use – Transportation Integration	Model Improvements
Short Term (2010-11)	**Data Development** • Conduct add-on Household Travel Survey to supplement the 2010/11 Caltrans Survey. • Collaborate with local transit agencies to conduct a comprehensive Transit On-Board Survey to validate transit mode choice model. • See also development of parcel database • Implement enhanced traffic count program for April 2010 to coincide with US decennial Census. Enhance HPMS sample sites and counts. • Update employment InfoUSA data base • Consolidate all available survey and count data including 101HOV speeds surveys, CMP intersection LOS data, CSMP and CMIA count data, and other ongoing study surveys for data bank deposits. **GIS / Web Applications & Data Management** • Implement TransCAD-For-The-Web for web-based data public access to meet SB375 transparency requirements. • Develop enhanced graphics for visualization by decision makers and the public.	**Off Model Improvements** • Collaborate with County eGIS Department to obtain and integrate parcel-level data in TransCAD. • Develop countywide regional / local model database consistency. • Digitize local land use plans in regional model data base • Evaluate land use models and software toward land use-transportation integration and recommend for appropriate land use model for deployment.	**On-Model Improvements** • Update model based on 2007RGF and calibrate model to 2005 Base Year. Prepare long-term (2030/40) forecasts. • Develop 4D Post-Possessor Module to address relative benefits of land use development alternatives. • Incorporate dynamic assignment validation procedure. • Expand bike and walk outputs to evaluate smart growth and TOD strategies. • Automate model performance evaluation and reporting capabilities. **Off-Model Improvements** • Explore other qualitative approaches to address equity and environmental justice and health issues for SB375. • Improve reporting through enhanced graphics and 3D visualization for public presentation.

Table 2: SBCAG Model Improvement Plan ROADMAP (Page 2 of 2)

	Data Collection, Management and Application	Land Use - Transportation Integration	Model Improvements
Medium Term (2012-14)	**GIS Application & Data Management** • Complete GIS resource constraint layer acquisition and analysis • Sustainable Communities Strategies (SCS) and/or Alternative Planning Strategy (APS) analysis to meet SB375 requirements. • Full scale implementation of TransCAD-For-The-Web for model data presentation and transparency. • Incorporate Traffic Solutions' Tri-County Commuter Profile Survey. • Continue development of centralized land-use and transportation data bank.	**On-Model Improvements** • Develop and apply Sketch Planning Tool to test alternative land use policies, growth scenarios and GHG reduction targets. Scenario. Examples include: - Infill, Density, Mix, Connectivity - Land Use + Fuel Pricing - Land Use + Transit + Fuel Pricing - Land Use Growth Rates - Job/Housing Balance - Committed and Optional Regional Development Patterns. • Evaluate regional effects of residential and industrial developments, green fields, transit, and redevelopment options • Implement full-scale Land Use Model and scenario planning capability.	**On-Model Improvements** • Incorporate enhanced model performance and reporting automation. **Off-Model Improvements** • Develop fuel price elasticity module as add-on module to test sensitivity of fuel price fluctuations to address impacts on transportation cost and traveler behavior. • Develop other off-model qualitative analysis capabilities to estimate impacts on social equity, environmental justice, public health issues.
Long Term (2015-20)	**GIS Application & Data Management** • Implement a fully centralized land use and transportation model databank as the core center for transportation planning and web-base application. • Comparison neighborhood studies coordinated with UCSB to assess impacts of land use density on mode choice and travel patterns	**On Model Improvements** • Full integration of an Interregional and Regional Land Use and Transportation Model Program with parcel-level land use and economic components. • Initiate development of Activity based model	**On Model Improvements** • Full implementation of On- and Off-Model improvements

V. Model Improvement Plan – Timeline, Cost, and Deliverables

Table 3 summarizes estimated milestones of deliverables, schedule, and cost for the SBCAG Model Improvement Plan. These costs are assumed to be funded from the Prop. 84 Grant.

Table 3: SBCAG Model Improvement Plan Deliverables and Cost Estimates

Time Frame	Milestones and Deliverables 2/	Date Of Completion	Estimated Cost 2/	
			SBCAG	Local
Short Term 2010-2011	**Data Gathering / Data Management & Application**	**Nov 2011**	**$155,000**	-
	• Add-on Caltrans Household Travel Survey,	Nov 2011	$100,000	
	• Transit OB Survey	April, 2010	$20,000	In-Kind
	• Enhanced Traffic Count Program	April, 2010	-	
	• Consolidation of all other survey data	Jun 2011	$10,000	In-Kind
	• TransCAD-For-the-Web implementation	Jun 2011	$20,000	
	• Update InfoUSA employment data base, Parcel level	Dec. 2010	$5,000	
	Land Use – Transportation Integration	**Jun 2011**	**$80,000**	In-Kind
	• Parcel-level database acquired, reviewed, & integrated	June., 2010	$50,000	
	• General Plans digitized	Dec., 2010	$10,000	
	• Initiate resource constraint data acquisition	Dec., 2010	$20,000	
	• Literature research & LU models evaluated/selection	Dec., 2010		
	Model Improvements:	**May 2011**	**$105,000**	
	• Update model to 2005 and update Forecasts	Jan. 2010	SBCAG	In-Kind
	• Dynamic Assignment, Model Performance and reporting automation.	Sept. 2010	$30,000	
	• 4D Post Possessor, Bike/Walk output analysis Link to Parcel data base.	Jan. 2011	$75,000	
Medium Term 2012-2014	**Data Gathering / Data Management & Application**	**Jan 2012**	**$210,000**	
	• Full Implementation of TransCAD For-The-Web	June 2011	$30,000	In-Kind
	• Final GIS resource layers acquisition and analysis	Jan2012	$50,000	
	• Tri County Traffic Solutions Commuter Profile Survey	2012/2013	$50,000	
	• Enhanced visual/3D graphics	June 2012	$50,000	
	• Development of centralized data bank/Serv	Jun 2012	$30,000	
	Land Use – Transportation Integration	**Jun 2014**	**$100,000**	In-Kind
	• Develop Sketch Planning Tool and test various land use scenarios	June 2012	$60,000	
	• Develop SB 375 scenarios for workshops	Jan 2013	$20,000	
	• Analyze SCS/APS and summary	Jun 2013	$20,000	
	On- and Off-Model Improvements	**Jun 2014**	**$40,000**	In-Kind
	• Test land use models	Jan. 2013		
	• Enhanced other model performance and automate reporting	Jan 2014	$20,000	
	• Conduct other qualitative analysis - social equity, environmental Justice, public health, climate change	Jan 2014	$20,000	
TOTAL	**Short- & Medium-Term Data Gathering & Model Improvement Efforts**	**Dec 2014**	**$700,000**	In-Kind
Long Term 2015-2020	**Land Use Transportation Integration/Model Improvements**	2015 -2017	$400,000 2/	In-Kind
	• Full-scale Integration of Land Use & Transportation Model Program			
	• Centralized land use and transportation databank and web-based application			
	• Development of Activity Based Model			

2/ Consultant assistance and costs assumed.

Coordination and Collaboration on Data Collection and Model Development with Other Affected Agencies

SBCAG has ongoing collaborative relationships with many other local and regional agencies including local cities, the County, neighboring MPO's, Caltrans, and the California Transportation Commission (CTC). The completion of *2007 Regional Growth Forecasts* and the *Regional Housing Needs Plan 2008* both involved close coordination between SBCAG, the County of Santa Barbara and all local agencies within the County. SBCAG and San Luis Obispo Council of Governments (SLOCOG) are currently working on a joint partnership on the *Central Coast Regional Blueprint Plan Pilot Study of the Santa Maria Valley*. Both agencies held a joint board meeting that validates the ongoing interest in collaboration at the highest level. SBCAG is also a participant in a regional transit coordinating committee with Ventura County Transportation Commission (VCTC). SBCAG coordinates with the Southern California of Governments (SCAG) on traffic forecasts at the County line and more recently utilized results of the SCAG's Travel Cordon Survey. Most recently, SBCAG modeling staff has been in active participation and consultation with State agencies (Caltrans, ARB, HCD, etc.,) and with all other 18 MPOs in a series joint consultations and teleconferences for the MPO Model Data Submittal to RTAC and for the ongoing development of the RTP Modeling Guidelines. SBCAG staff is also actively participating in all the California Inter-Agency Modeling Forums, particularly on issues related to interregional and external travel and statewide model enhancements and update efforts. In addition, SBCAG is the Co-Chair of the Central Coast Model Users Group for regional model coordination and collaboration with all Central Coast and local modeling partners.

Locally, SBCAG has two advisory committees to assist in the development, application, and ongoing improvement to travel modeling. The Technical Transportation Advisory Committee is composed of representatives from all the local public works departments, Caltrans, APCD, and a major transit provider. The Technical Planning Advisory Committee is composed of representatives of all local planning departments and the APCD. Local public works department representatives and transit operators have already agreed to an enhanced count program to coincide with the April 2010 Census.

This data acquisition and model improvement work will be also furthered by the existing relationship between the UCSB Geography Department and SBCAG. SBCAG has a technical relationship with UCSB, Geography Department Professor, Dr. Konstadinos Goulias. Dr. Goulias will provide technical assistance, assist in the implementation of the SBCAG Model Improvement Program, and, SBCAG will use students in this program for data development and analysis. SBCAG is excited about the practical and research potential associated with this relationship. For example, the development of comparison neighborhood studies to assess the implications of travel patterns between low and high density neighborhoods is a critical need to further best management practices and SBCAG will work closely with Professor Goulias to improve the state of the art in this area. SBCAG will also benefit by the current work of Dr. Goulias with our neighboring MPO to the south, SCAG, on Activity Based Models.

VI. SBCAG Statements of Commitment

SBCAG agrees to submit quarterly progress reports that include detailed information on the progress of each identified milestone, expenditures to data, and remaining funds. SBCAG will use the existing OWP reporting process for quarterly reports to fulfill this requirement.

SBCAG commits to implementing the Model Improvement Plan consistent with SB 375, public transparency requirements, and the State RTP Guidelines.

SBCAG commits to the data gathering requirements to implement Model Improvement Program specified in Section IV of the Grant Guidelines.

SBCAG commits to provide web access to all materials related to the application and award of these Proposition 84 funds, including: application, status updates and reports, and final deliverables.

The data gathered and models developed with the use of Prop 84 funding shall remain in the public domain. Data developed under this program will have metadata which will be developed to comply with Federal Geographic Data Committee metadata standards. The metadata will be registered at CalAltas (http://www.atlas.ca.gov).

The SBAG Model Improvements Program will assist the State in meeting the Goals of the Strategic Growth Council.

The SBCAG model improvements effort will help improve air and water quality and protect natural resources and agriculture lands as SBCAG will help and manage GIS data layers. SBCAG will prepare files to address resources areas identified in SB 375, publicly owned parks and open space, habitat areas, conservation and agriculture easements, biological resources, areas subject to flooding, prime or unique farmland and other factors identified in Government Code 65080.01 (a) – (e).

Improved integration of land use and transportation planning will also improve the transportation system and assist state and local entities in the planning of sustainable communities and meeting AB 32 goals. The integration will Improve public health, reduce GHG emissions, and facilitate biking and walking, among other benefits.

Appendix I - The Existing SBCAG Travel Model

SBCAG currently maintains a countywide regional travel demand model (SBCAG Model). Staff applies and maintains the model in-house and works in close cooperation with state, regional and local agencies to forecast traffic growth, assess demand for transportation infrastructure improvements, evaluate corridor alignment alternatives, and in the recent past, when SBCAG was designated as a federal ozone non-attainment area, determine air quality conformity between the SBCAG Regional Transportation Plan (RTP) and Federal Transportation Improvement Program with our County State Implementation Plan.

The SBCAG model is a traditional 4-step trip-based model. The four main models are trip generation, trip distribution, mode choice, and assignment. The model domain consists of Santa Barbara County plus the two neighboring counties of Ventura and San Luis Obispo. A total of 268 internal (Santa Barbara County) zones are augmented by 5 external zones from San Luis Obispo County in the north and eight external zones from Ventura County in the south. Eight trip purposes model various trip making characteristics, including home-based work (HBW), home-based shop (HBSh), home-based school (HBSc), home-based other (HBO), non-home-based work (NHBW), non-home-based other (NHBO), visitors (VIS), and Internal-External/External-Internal (IX-XI) trips. Trip production and attraction are matched and balanced in the Trip Generation module. Trip Distribution is conducted through the use of a gravity model.

The network contains comprehensive highway and transit network systems. The highway network contains over 11,000 roadway links and 4,000 nodes grouped under various functional classifications based on area and facility type.

A multi layer logit mode choice model is employed to analyze and predict choices of travel mode. The nested structure allows daily persons trips to be modeled more precisely by various sub-modes. Initially, person trips are separated by motorized and non-motorized modes. The next layer further separates motorized trips into auto, carpool and transit and non-motorized modes into bike and walk trips. Transit trips are modeled under local and express bus sub-modes. They are then sub-divided under Park-and-Ride and Kiss-and-Ride sub-modes. Carpool trips are modeled under 2-person and 3+ persons. Auto occupancy is used to transform highway person trips into vehicle trips. Mode choice outputs include bike and walk trips.

Once transit trips are estimated, they are assigned to a transit route network. This network is a comprehensive route structure developed for eight types of transit services provided by five major transit operators who deliver transit services in the County. This network also includes two inter-county transit services operated by transit agencies outside the county. The transit database incorporates information on transit operators, their respective route systems, ridership, frequency, route stops, fares and other transit accessibility parameters. Transit trips are assigned on the transit network for assignment. The model output is daily and annual ridership (boardings).

The SBCAG Model employs a socioeconomic, distinct from land use, data-base. The model database consists of a variety of data including households, employment, household size, income, plus a number of special generators such as UCSB, the Vandenberg Air Force Base (VAFB), the US Penitentiary at Lompoc, state parks, beaches, and other tourist attractions within the county, plus the entire spectrum of the 2000 Census database. The employment data

was developed from the nationwide InfoUSA database and was refined and redistributed by TAZs based on local input, research, and field surveys to ensure accuracy for the 2000 base year.

The 2001 Caltrans Household Travel Survey for Santa Barbara County provides crucial travel information on trip purpose, modes, trip lengths, frequency, and other travel characteristics including time-of-day (TOD) distributions for model calibration and validation. In cooperation with local jurisdictions SBCAG conducts an annual traffic count program to support travel forecasting and traffic monitoring activities. These data are used in validating the model to examine how closely the model replicates base year conditions. The Traffic Solutions Division of SBCAG also conducts voluntary employee commuter surveys every five years to promote ride sharing and this data is also used to support model validation.

Peak hour traffic is modeled under 3 time periods (AM, PM and Midday). The AM peak hour represents the portion of the hour from 7 AM to 8 AM. PM peak hour traffic is modeled from 4 PM to 5 PM, and the Midday peak is modeled from 12 noon to 1 PM. Time-of-Day distribution is used to estimate daily traffic under an average weekday. Highway speed and capacity look-up tables are developed based on the Highway Capacity Manual (HCM), with adjustments based on local geographic conditions. Delay is modeled using standard BPR equations.

Vehicle trips are assigned to specific paths on the highway network in the assignment process. The user equilibrium method is employed with a Multiple Successive Averages (MSA) approach for calculation of "congested" speeds. Three feedback loops are performed to feed congested speeds from Assignment back to Trip Distribution. A convergence criteria (relative gap) set at 0.001 or 50 iterations, whichever comes first, is employed to assure convergence.

In 2007 as part of the 101 In-Motion Study, the SBCAG Model capabilities were significantly enhanced. A "High Occupancy Vehicle (HOV)" lane modeling capability was added. A Multi-Modal Multi-Class Assignment (MMA) approach is employed in order to more accurately model traffic demand of the planned HOV improvements on Highway 101. In addition, traffic demand management (TDM) modeling assessment capabilities were incorporated to evaluate TDM measures as recommended in the 101 In-Motion corridor study. This included enhanced expressed bus, telecommuting, and flexible work schedules as well as analyzing the effects of implementing an enhanced commuter rail option between Ventura, Santa Barbara and San Luis Obispo counties.

Currently the SBCAG Model is used for long range forecasts, plan development, and air quality analysis. A post-process procedure is used to determine congested link speeds by speed class for conformity and air quality analysis. The post-processor interfaces with the latest ARB's air quality model (EMFAC2007) to determine vehicular emissions for base and future years for alternative RTP scenarios.

The SBCAG model runs on the TransCAD platform. "Traffix" software from Dowling Associates is used to supplement the analytical capability for intersection level of service analyses under the Congestion Management Program (CMP). The SBCAG Model is maintained in-house with continuing refinements. However, SBCAG relies on consulting assistance for major updates.

Additional information about the SBCAG Model structure, model calibration and validation procedures, and traffic forecasts are available in the document entitled "The 2030 Travel

Forecast for Santa Barbara County, Final Report, September, 2004". The report is available in the publication section of the SBCAG website.

The current SBCAG Model is based on the 2002 RGF. In the next few months, staff will be updating the SBCAG Model from the 2000 to 2005 base year. The model update will also use the new adopted 2007 RGF with long range travel forecasts projected to the year 2040. The year 2005 will be the new base year, per recommendations by the RTAC.

Appendix II - SBCAG Travel Model Data and Capability Improvements to Meet SB375 Requirements

During February this year, the Regional Targets Advisory Committee (RTAC) requested that the 18 MPOs around the state provide information on existing modeling capabilities and data collection programs. This survey assisted RTAC in developing their methodology for GHG emission reduction target recommendations to the California Air Resources Board (ARB). Their assessment focused on two general concerns:

- *Are MPO models reasonably sensitive to key factors and policy variables which are potentially of great interest for target-setting or implementation of SB375?*

- *Are models comparable in their capabilities across the state, providing a "level playing field" for evaluation of land use or transportation policies or factors of interest for target setting or implementation of SB375?*

SBCAG and other MPOs participated in this exercise which identified current modeling capabilities, existing data and technical gaps in travel and land use modeling. Although SBCAG's existing travel model protocols are consistent with the federal and state guidelines for travel models, SBCAG will need to significantly enhance our existing data and travel model methods to address the requirements of SB 375. The following is a self assessment which identifies data and technical gaps in the SBCAG travel model and land use assessment process.

1) Data Gaps on Travel Behavior

As indicated in the MPO survey SBCAG reported data gaps in the area of current travel characteristics and travel behavior, particularly the need for improvements in household travel data, transit ridership data, bike and pedestrian ridership, external travel data among other factors (See Figure 3a of the "*MPO Data Collection/Monitoring Program Assessment Summary*" (the Bubble Chart) submitted to RTAC in May 5, 2009). This data can be obtained through Household Travel Surveys/External Travel Surveys

The SBCAG Model relies on survey data for model calibration and validation in order to capture all trip types and trip characteristics. SBCAG lacks the funding and mechanism to expand the Caltrans Household Travel Survey sample to address the geographic diversity of Santa Barbara County.

The statewide household travel survey (Caltrans Survey) is the most often cited source for travel behavior in regional travel models. This is also the most comprehensive household survey that can be used for model development, calibration, and validation, and to establish statistical trends about the travel behavior of Santa Barbara County households. As a smaller MPO, SBCAG does not have the resources to conduct any household travel surveys or Cordon Surveys at the county lines. Over the years, the Caltrans Survey is the only reliable source for SBCAG Model calibration and validation. The 1991 Caltrans Survey has been used to calibrate the 1990/96 Model. The new model replacement and update completed in 2004 used the 2001 Caltrans Survey. However, in 2001 SBCAG had to augment the survey with local funds to increase the sample size by 50% in order to obtain sufficient statistical valid samples for the new model development and calibration. In 2010, once again SBCAG will rely on the upcoming

the 2011/12 Caltrans Survey. Even so, the expected allotment of 500 samples is believed to be insufficient again to provide a statistical valid sample particularly with the requirements of SB375. Some kind of supplemental household travel surveys will be needed to augment the Caltrans Survey in order to obtain a statistical valid sample size.

One of the challenges in estimating of VMT and establishing GHG emission reduction targets for MPOs is the estimation of future external travel resulting from MPOs' regional models. In this region, estimation of external travel includes estimation of inter-county trips coming from or going to Ventura or San Luis Counties from/to Santa Barbara County (IX-XI trips) and trips that going through Santa Barbara County (XX Trips) on a daily basis. External trips are particularly important for this region because Highway 101 is the only primary north-south travel corridor through this region. In addition, Santa Barbara is a world-renowned tourist attraction destination on the Central Coast. One key source to calibrate and validate these external trips is from the Statewide Travel Model. However, previous and existing versions of the Statewide Travel Model have repeatedly indicated a much higher percentage of external trips when they are compared to historical counts at county lines and from neighboring MPO models (SLOCOG Model and the VCTC Model). With SB375, SBCAG expects more accurate and consistent external travel information coming from the State Travel Model. As part of the Prop 84 funds that are planned for updating the current statewide model, this will greatly enhance the validation of the SBCAG Model in the future. Even if the state increases our allotment size with Prop 84 funds, SBCAG will still need the funds to pay for additional samples. SBCAG proposes an additional1,000 samples.

In addition to the travel survey data, SBCAG needs additional data on transit users to develop and calibrate the transit portion of the mode choice model. In the past, the state survey generated relatively few valid transit samples. SBCAG was also unsuccessful in soliciting assistance from local transit operators for transit on board surveys due to their financial constraints. As a result, SBCAG had to borrow other similar size MPO's transit model as a surrogate to complete the transit mode choice model development. This resulted in one of the recommendations during the 2008 SBCAG Model certification process from FHWA that SBCAG needs better data to assist in the validation of the mode choice model for transit.

2) Data Gaps on Employment

Employment data is used in the SBCAG model to generate trip attractions. The SBCAG model employs the socioeconomic database approach. Employment is based on the InfoUSA database, a nationwide employment database that tracks employer statistics such as employer addresses, categories and number of employees. During the model development phase the InfoUSA database was further refined and redistributed by Traffic Analysis Zones based on local input, staff research, and field surveys to ensure accuracy for the 2000 base year.

The employment database requires editing to ensure all major employers are included. For example, a number of major shopping centers in the InfoUSA database do not contain employment estimates. SBCAG estimated this employment by using secondary sources and building square footage ratios to estimate employment. Other discrepancies in the database include the underestimation of employment in healthcare facilities and omission of agricultural greenhouses on the South Coast. These facilities were subsequently added using information from local jurisdictions and staff field surveys. The data base now requires updating.

3) Data Gaps on Land Use

In the "MPOs Self Assessment Data Submittal" to RTAC, SBCAG has indicated a lack of modeling capacity in addressing land uses at the micro-level, particularly on issues related to land use alternatives, transit oriented development, density, mixed use, and pedestrian environment. (See Table 1a, *MPOs Self Assessment of Current Model Capacity and Data Collection Program, May 2009.*)

The socio-economic database of the SBCAG Model comes from the adopted regional growth forecast (RGF) whereas local traffic models in the region generally employ land use data-based models using their respective general plans. These local models are specifically tailored to address the traffic impacts of local land use plans and individual developments. The land use databases of the local models do not correlate with the socioeconomic data of the SBCAG model nor are they consistent between adjacent jurisdictions. In addition, ongoing land use updates from local general plans and periodic revisions of the SBCAG regional growth forecast present additional challenges in terms of database consistency between regional and local models.

Recognizing the key in addressing the land use and transportation connection rest primarily on a solid land use database, an important consideration is to acquire and implement a parcel-level land use database as part of the SBCAG Model. One option is to develop a broad base parcel-level traffic analysis zone (TAZ) for the SBCAG Model. Major MPOs' models such as the Sacramento Area Council of Governments (SACOG) and San Diego Association of Governments (SANDAG)'s model employ parcel-level data for their land use modeling and/or Blueprint efforts. This approach would achieve a credible land use database useful for addressing the land-use–transportation connection for SB375 would also improve database consistency between the regional and local models. However, this approach requires a major shift in re-establishing the SBCAG Model database application and resources. This effort would also require a universal conversion table toward database consistency for the entire region and a close collaboration between Santa Barbara County, SBCAG and all local jurisdictions.

4) Data Gaps on Environmental Constraints

SBCAG has inventoried the availability of GIS environmental constraint layers in Santa Barbara County (e.g., SBCAG, The Santa Maria Valley-Southern San Luis Obispo Regional Blueprint Planning Pilot Study, Geographic Information Data Overview). However, SBCAG has few digital GIS inventories of resource areas to enable use of GIS rule based applications. SBCAG will need to obtain and prepare files to address the following resource areas identified in SB-375: Publicly owned parks and open space, habitat areas, conservation and agriculture easements, biological resources, areas subject to flooding, prime or unique farmland, among other factors identified in Government Code 65080.01 (a) – (e). In some cases SBCAG will be able to upload existing environmental constraint shape files.

SBCAG already has digital air photos for existing land use data, but additional constraint layers need to be obtained.

5) Supplemental Capability: Land Use-Transportation Scenario Development

Currently SBCAG accounts for land use constraints and opportunities using the buildout potential of local land use plans. These plans provide the basis for estimating the new development potential for each Traffic Analysis Zone in the SBCAG model. However, SBCAG does not have dynamic land use modeling capacity and would likely initially rely on the Best Management Practices (BMP) to assess the land use / transportation connection in order to meet the GHG reduction targets. How can the SBCAG Model effectively be used to evaluate land use scenarios in order to reduce GHG emissions? The following are a few examples of key testing scenarios SBCAG needs to ensure the model improvements address in the near future:

1) What impacts would there be on traffic in general of modifying land use development of planned areas in the local jurisdictions' general plans?

2) How would re-distribution of land use development impact regional travel?

3) How would mixed use, infill development, transit oriented development, redevelopment, and improved transit/pedestrian connectivity and impact travel?

SBCAG needs to add capability to the SBCAG model to be able to answer these questions. This capability is also critical to engage the public in the development of land use alternative development and selection.

The SBCAG Model currently generates non-motorized trips such as bike and walk trips. However, SBCAG needs to expand this modeling capability by utilizing these available non-motorized outputs to evaluate the sensitivity of smart growth strategies and transit oriented development as part of the preparation of SCS/APS strategies to address GHG emission reduction targets.

6) Supplemental Fuel Pricing Capability

The current SBCAG Model does not have a "road pricing" option, for example, examining congestion pricing and fuel price fluctuations. The option of modeling congestion pricing such as high occupancy toll (HOT) lanes in Santa Barbara County does not appear to be feasible based on the information in the Highway 101 corridor analysis, 101 In Motion. However, due to recent fuel price increases and the public interest in how the cost of fuel might impact travel, SBCAG needs to add the capability to model travel impacts resulting from fuel price fluctuations. SBCAG will incorporate this modeling capability to assess the relationship between the propensities to travel based on fluctuations in gasoline prices.

Appendix III - SBCAG Model Improvement Plan (MIP)

Specific model improvement work tasks are identified to fill data gaps and add modeling capability and are described under three timelines: Short Term (2010-2011), Medium Term (2012 to 2014), and Long Term (2015–2020). Within each timeline, specific elements of model improvements are discussed with respect to the following two major areas:

- Data development
- Model Improvements

The specific work tasks are itemized below and summarized in Table 1.

Short Term (2010-2011)

Data Development

a) Household Travel Survey

Travel demand modeling requires an immense amount of data to support its development, validation, and continued maintenance. For smaller MPOs such as SBCAG, the California Statewide Household Travel Survey (Caltrans Survey) is the only available and comprehensive household travel survey conducted in our region. SBCAG has been a close partner with the Caltrans Survey process for over thirty years. As a member of the latest Caltrans Travel Survey Sub-committee, SBCAG has been working closely with Caltrans and other MPOs toward the development and the design of the new 2010/11 Caltrans Survey to address the SB375 needs. Under an expectation of a similar sample size allotment for Santa Barbara County and the need to analyze the travel characteristics required under SB375, the sample size for this region would need to be significantly increased. This implies that SBCAG would require even more additional survey samples.

Assuming the same previous 500 samples allotted for Santa Barbara County, SBCAG is prepared to use the Prop 84 funds to supplement the Caltrans Survey samples, at least doubling the original sample size (for a total of at least 1,000 samples) to augment our original allotment samples. SBCAG intends to use the same survey instrument, but with consultant assistance to conduct such an effort. The survey process is expected to be identical to the Caltrans process, i.e., using travel diaries, GPS for record tracking and matching, and followed up with phone interviews, etc.

b) New Transit On-Board Survey

Transit On-Board Surveys are an important source for updating and validating the current SBCAG mode choice model. A key use of this survey is to assess the impacts of transit oriented development land use options on public transit use as required by SB 375. No transit on-board survey has ever been conducted in Santa Barbara County. As indicated in the Section III, the SBCAG Transit Mode Choice Model development used other MPOs' surrogate model data.

As part of the transit model improvements for SB375 and in response to FHWA recommendations for validation of the mode choice model using local data, SBCAG requested

transit operators' assistance in March 2009, through the Santa Barbara County Transit Advisory Committee (SBCTAC), to conduct a countywide transit on-board survey in April 2010 to coincide with the Census 2010. The objective is to obtain a minimum of approximately 4 percent or 1,300 valid weekday transit on board samples to coincide with the US Census timeline.

The transit operators will administer the survey, providing in-kind support, and the Prop 84 funds will be utilized for data processing and analysis. The survey will collect transit ridership characteristics and assist SBCAG in replicating local transit ridership travel and assess changes in the impact of changes in speed, frequency, and availability of transit services on transit ridership.

The survey period is expected to be a 5-day or work week-long effort (depending on transit operator and its route system) with proportional distribution of surveys among all transit operators and routes. SBCAG will provide administration and management of the survey, and the translation of the survey instrument into Spanish. Consultant assistance will be employed to provide data analysis and the subsequent re-calibration of the SBCAG transit mode choice model. The transit on-board database will be used to analyze transit trip frequencies, trip origins and destinations, accessibility, and trip percentages, among other factors.

This survey effort could be labor intensive. However, a valid and comprehensive transit on-board survey for Santa Barbara County will provide mutual benefits for SBCAG and all local transit operators. SBCAG's Mode Choice Model will be able to be validated with local data firsthand and local transit operators will be able to utilize the survey information to improve their services.

c) Parcel land use data base development

SBCAG will initiate development of a parcel based data system to enable microlevel scenario evaluation. A parcel based information system will be designed for implementation with the TransCAD Travel Model Software and IPLACE3S. Parcels will be overlaid on air photos to assess existing land use. Local land use plans will be converted to digital format on a parcel base. Generalized land use classifications will be developed to enable modeling across jurisdictions.

d) Employment data updates

The 2010 InfoUSA employment data base will be purchased, edited, and used to allocate employment and estimate trips within the SBCAG model.

Model Improvements

The state-of-the-practice in travel demand modeling is rapidly evolving. SBCAG intends to keep up with the advances by employing Best Managements Practices (BMP) to achieve reasonable levels of sensitivity for SB 375 implementation purposes. The following are specific short-term On- and Off-Model improvements.

a) 4D Post-Processing

A "4D Post-Possessor" has been considered and recommended by RTAC and in the RTP Modeling Guidelines as one of the BMPs to achieve effective interim land use-transportation integration. "4D" refers to Density, Diversity, Design, and Destinations (Accessibility). These four factors (there may be other factors as well) are generally used to characterize land-use and transportation infrastructure. An elasticity approach for measuring transportation impacts of the 4D factors allows analysis of the relationships between land use and travel behavior. Elasticity is used to estimate the percentage change in vehicle trips (VT) and/or vehicle miles traveled (VMT) that may result from various land-use plans and urban designs. Thus, a set of "4D elasticity factors" related to a region, sub-region or a neighborhood's built environment characteristics and accessibility can be used to relate to the amount of VT generated in the region or area. The following table shows the 4D elasticities in relation to VT and VMT[1].

4Ds	Daily Vehicle Trips	Daily Vehicle Miles Traveled
Density	-0.04	-0,05
Diversity	-0.06	-0.05
Design	-0.02	-0.04
Destinations (Accessibility)	-0.03	-0.20

SBCAG will solicit, obtain, install and use a "4D Post-Processor" module as a quick-response tool for assessing the relative benefits of one land use pattern versus another based on the defined land use development scenario in the short term.

b) Dynamic Assignment

The current SBCAG's Assignment Model employs a multi-modal multi-class traffic assignment procedure. Vehicle trips are assigned separately through different trip tables onto HOV and general purpose freeway facilities. Transit trips from the mode choice model are assigned separately onto the transit network overlaying the roadway network. However, the current assignment is in a "static" state. This means that the model output produced from one scenario is primarily based on one set of input variables. Comparison of model output can only be conducted per the "pre-determined" scenario based on programmed or planned roadway improvements.

In recent years, dynamic assignment is recommended as a BMP. More MPOs have embraced this procedure whereby variations of the amount of a particular model input, such as number of households or employment within a sub-area or a land use type and quantity, can be tested and compared with the magnitude and direction of change from the original forecast so that the outcome can be described in a more realistic way. For example, changes in "model-wide" VT or VMT per socioeconomic or land use unit change (number of dwelling units/employment or 1,000 square feet of retail space within a sub-region) can be visualized in terms of its relative changes of transportation impacts. These changes can be applied to a TAZ level, or in terms of land use mix, land use density, and transportation accessibility, etc. within a region. The model output should reflect such relative change by examining the change in trips.

[1] Assessment of Local Models and Tools to Assess Smart-Growth Strategies, Caltrans, January 2007

SBCAG will solicit, and employ a "multi-modal multi-class dynamic assignment procedure" as part of the assignment process to validate the performance and sensitivity testing of SBCAG's Assignment Model in the short-term.

c) Enhancement of Bike and Walk Model Output

As indicated earlier, the SBCAG Model is able to generate bike and walk trips as part of the non-motorized output. Part of the SBCAG Model Improvements will expand their use in response to smart-growth strategies formulated in the SCS/APS. The bike and walk model outputs will be tied to the 4D Post-Processor Module to illustrate the effects of individual smart-growth strategies such as infill, redevelopment, mixed use, and Transit Oriented Development on alternative mode utilization. Bike and walk trips will also be quantified by region and by sub-area for visual presentation.

d) Enhancement of Model Evaluation and Reporting Automation

The SBCAG Model currently automates the conventional model output reports such as VMT, VHT, daily person trips and vehicle trips. The model's flexibility to generate other model performance information or data is somewhat limited.

SBCAG plans to expand and automate model outputs by incorporating as many of the performance measures that are required by SB375 and/or for interest by the general public as possible. This will also address the model transparency requirements.

It is believed that such work tasks will require modifications in the modeling programs and structure; therefore, consulting assistance will be required. These work elements are tasked for completion both in the short and medium term. The following table identifies some of the examples of the enhanced version of SBCAG Model selected for automatic output as part of the RTP performance measures in the short term.

Mode	RTP Performance Measures	Short-Term Model Output Automation
Highway/ Roads	System Performance	VMT, VHT, Daily Person and Vehicle Trips, Total Lane-Mile and Congested Lane-Mile (LOS E & above)
	Mobility	Average Free Flow Speed, Average Congested Speed
	Reliability	Total Daily Vehicle Hours Delay
	Environmental Quality	Automatic Emission Reduction
Transit	System Performance	Daily Weekday Transit (Bus) Trips Daily Ridership, Annual Ridership
	Mobility/Accessibility	% Population and employment within ¼ Mile of frequent Bus Routes
Bike/ Pedestrian	System Performance	Total Daily Bike Trips, Total Daily Pedestrian Trips Total Completed Bikeway Mileage, Total Planned Bikeway Mileage

e) Consolidation of other available survey data

With the ongoing and planned data gathering efforts, SBCAG plans to initiate a regional data management plan with a centralized databank system to consolidate the data collection and streamline the data management efforts. The Prop 84 funds will also be used to consolidate all

other available survey data from a number of ongoing studies and expanded traffic count programs. Counts from ongoing studies such as ramps and mainline Highway 101 traffic counts from 101HOV Study, the Congestion Management Program annual inventory of intersection LOS data, the intersection counts from the Caltrans Corridor System Management Plan (CSMP) and the Caltrans Corridor Management Improvement Account (CMIA) project, and the enhanced local traffic count program scheduled for April 2010 (which was also designed to coincide with the US decennial Census) will be consolidated. This later effort has also been developed in cooperation with local city and County public works staff. The Traffic Solutions Division of SBCAG conducts a voluntary Tri-County (Santa Barbara, Ventura and SLO Counties) Employer Commuter Profile Survey every five years. The last commuter profile survey was conducted in June 2007. The next survey will be conducted in 2012. SBCAG will continue to work with Traffic Solutions to continue use of all available surveys to serve both modeling and Traffic Solutions needs.

Medium Term (2012-14)

Data Development

a) Parcel Data Base Integration with Travel Model

Part of the early land use data base development is a parcel level land use information system. SBCAG will collaborate with Santa Barbara County's Enterprises GIS (eGIS) Department on integrating the County Assessor's parcel database into the SBCAG Travel Model database. By 2011, SBCAG expects to complete such integration in order to be able to analyze macro-level land use characteristics across relatively large spatial areas. Parcel-level land use distribution and integration with SBCAG Model Traffic Analysis Zones (TAZ), an universal spatial modeling unit for travel models, will enable SBCAG to provide more precise spatial distribution of households, population, jobs and other variables countywide. This model improvement will facilitate consistency with land use-transportation integration and land use scenario planning. It will also allow a micro-level land use analysis, for a city or a sub-area in smaller grid cells, for testing land use options to determine GHG emission reduction benefits. Since several local jurisdictions in this county (i.e., Cities of Santa Barbara, Goleta, Lompoc and Santa Maria) are either in the process of developing or updating local traffic models that have a parcel-level TAZ data base. These data sets will help create a consistent regional-local model database, furthering compliance with SB375 requirements.

b) Environmental Constraint Layer Acquisition

SBCAG will obtain new GIS data in shape file format for use in scenario planning. This data will address the resources identified in SB 375. The data will enable a comprehensive picture of development opportunities and constraints.

Model Improvements

a) Sketch Planning Tool Acquisition and Development

While development of the land use transportation connection is proceeding to a full modeling scenario capability SBCAG will develop sketch planning capability. Recommended by RTAC as

part of the BMP list, a sketch planning tool is used to conduct preliminary testing of alternative land use policies and GHG reduction targets Sketch Planning Tools can be spreadsheet based tools to provide some indication of the magnitude of the change of travel impacts (e.g., VT or VMT), thereby resulting in some magnitude of GHG emission reduction. This tool would explain the differences with key inputs and outputs resulting from combinations of land use scenarios or a particular set of land use policies. According to *RTAC Draft Recommendations to ARB pursuant to SB375, September 9, 2009*, the sketch planning tool should include policies for which either empirical studies or travel models exist to estimate the likely impacts of their implementation. Therefore, it serves as an initial screening tool to facilitate the development of more sophisticated transportation/land use modeling. It also allows MPOs some initial indication when formulating GHG reduction policy choices for SCS development and implementation.

A Sketch Planning Tool could be developed through an expert consultation process, involving a group of technical experts and model practitioners, including MPOs, academia, business communities, local jurisdictions, social equity and labor advocates, builders, and planners. It should be developed with a user interface to test the combined effects of land use policies, whether the region is rural, urban, or suburban. According to the RTAC recommendations, the Sketch Planning Tool would in turn estimate VMT and GHG reduction estimates based on input such as residential or employment density, estimated share auto trips, transit share etc. For a policy scenario, the Sketch Planning Tool should be based on set of criteria such as:

- Accounting of synergistic (positive and negative) effects
- Ability to analyze strategies on a regional, local or project level
- Financial and resources constraints
- Consistency with federal air quality regulations
- Peer Review

Sketch planning is useful for both short-range and long-range regional planning and corridor analyses. The tool can yield aggregate estimates of results such as VMT, energy consumption, and GHG emission reduction targets.

SBCAG intends to explore and develop a Sketch Planning Tool as early as possible in the medium term to group and test combinations of meaningful land use scenarios such as establishing a baseline or defining existing land use and development scenario "in the pipeline". SBCAG plans to formulate these land use scenarios from different regional development growth strategies, direction of growth, scenario combinations, and to screen out infeasible ones in order to get an early understanding of GHG emission reduction targets prior to formulating SCS/APS. SBCAG plans to use consultant assistance to develop a Sketch Planning Tool as an early understanding of the impacts of GHG reduction policies. The following are some of the land use development policy choices for testing:

- Residential Densities
- Industrial Development
- Greenfield Areas
- Transit and/or Transit Orient Development,
- Equity and environmental justice issues such as effects of transportation and development scenarios on low-income or transit dependent households, and
- Effect of non-motorized modes, i.e., Bike and Walk.

b) Land Use Model Package Evaluation and Selection

SBCAG will also evaluate land use model software packages currently available in the marketplace. SBCAG will learn from MPOs who are currently using land use models for their Blueprint planning efforts to ensure that an appropriate tool be employed for Santa Barbara County. SBCAG intends to select one land use model to allow flexibility in analyzing macro-level and micro-level land use development policy options and to integrate these options seamlessly within the SBCAG Travel Model. The IPLACE3S model currently used by Sacramento County Association of Governments (SACOG) and the PECAS Model currently employed by UC Davis for development of the Statewide Integrated Interregional Model (SIIM) are viable candidates. SBCAG will conduct in-depth investigation on the suitability and appropriateness of such land use models for use in this region. Of particular interest is the data intensiveness and model capability to address land use policy issues and GHG emission reduction and the ongoing fees, maintenance, and staff resources necessary to apply the model. Following this review, SBCAG will select, purchase, and develop this land use modeling capability

c) Specific On-and Off-Model Enhancements

I) Congestion Pricing and Fuel Pricing

SBCAG intends to add the capability of analyzing travel impacts due to fuel price fluctuations. Fuel price elasticities will be researched and incorporated as part of the Off-Model post processing enhancements to test the sensitivity of the fuel price hikes on travel. SBCAG will have the flexibility to "turn on or off" this feature and to assess the implications of fuel price fluctuations on regional travel. Consultant assistance will be required to develop, test, and apply this additional modeling capability.

II) Web Based Modeling Capability

SBCAG is committed to the implementation of "TransCAD-For-The-Web" to provide information online to the general public. This package includes interactive mapping capabilities for socioeconomic data, trends, travel demand, Census 2010, and 2005-07 American Commute Survey information, county to county traffic flow, traffic counts, and future travel forecasts, etc. SBCAG is also committed to the development of online travel forecast summaries.

Long Term (2015-2020)

In the long term, SBCAG's goal is to pursue the following model improvements:

- The implementation of a centralized land use and transportation model databank
- Activity-based modeling
- A full Integration of Interregional Land Use and Transportation Model Program

The current literature and state of the practice suggest that the current emphasis in the advancement of the development of travel demand modeling will be the implementation of tour- and activity-based models. Major MPOs in California such as SACOG, SANDAG, and SCAG are either applying or developing activity-based models simply because the tour- or activity-based models can more accurately reflect the chain trips and traveler behavior, thereby more

accurately reflecting the benefits of GHG emissions and reduction policies. SBCAG intends to pursue activity-based models as our long-term commitment to model improvement. Our ultimate goal is to pursue a full integration of an Interregional Land Use and Transportation Modeling Program using an activity-based model. The implementation of a centralized land use and transportation model data bank will help accelerate the efficiency and transition our modeling improvement process as well.

This long-term work will be furthered by the existing relationship between the UCSB Geography Department and SBCAG. SBCAG has a technical relationship with UCSB, Geography Department Professor, Dr. Konstadinos Goulias. Dr. Goulias will provide technical assistance, assist in the implementation of the SBCAG Model Improvement Program, and, SBCAG will use students in this program for data development and analysis. SBCAG is excited about the practical and research potential associated with this relationship. For example, the development of comparison neighborhood studies to assess the implications of travel patterns between low and high density neighborhoods is a critical need to further best management practices and SBCAG will work closely with Professor Goulias to improve the state of the art in this area. SBCAG will also benefit by the current work of Dr. Goulias with our neighboring MPO to the south, SCAG, on Activity Based Models.